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ABSTRACT

The exercises described in this booklet comprise a physical fitness program of moderate intensity. Exercises are graded according to difficulty, and, in most cases, balanced to encompass physical fitness components essential to health, maintaining optimum body weight, and promoting efficient movement. Illustrations and descriptions are given of: (1) warm-up, aerobic and weightlifting exercises; (2) a basic fitness workout; (3) interval training techniques; (4) circuit training (a non-stop progressively controlled sequence of exercises); (5) and aquabics. (JD)

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province of manitoba
department of education 1981

TRAINING METHODS

A resource package to supplement the
Physical Education curriculum
in Manitoba schools

Manitoba Department of Education
1981

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Pages 43-45: T. W. Connoly, YMCA, Vancouver, British Columbia.

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INTRODUCTION

THE GOALS OF FITNESS PROGRAMMING

> "While it is easy to convince a person in pain to see a physician, it is not easy to get someone not in pain to moderate insidious habits in the interests of future well-being."
>
> - The Honourable Marc Lalonde
> Minister of National Health and Welfare, 1974

The term, "getting fit" makes many people think about high intensity competition, superstar challenges, and elimination circuits of the type used in pre-season sports camps and fitness contests. While these programs do have their place, they should be identified as "P.T. sports regimens" and not be confused or integrated with developmental training techniques and activities which can be integrated into one's daily routine to improve the basic level of health and well-being.

Indeed, the benefits of physical activity reach far beyond improving the actual physical state of the participant. Besides improving heart and lung efficiency, and reducing the incidence and severity of musculoskeletal problems, proper physical activity can contribute to weight control, increased efficiency at work and at play, the reduction of stress and tension, and the modification of a variety of harmful habits such as poor nutrition and the use of tobacco, alcohol, or drugs.

Some of the program ideas contained in this booklet are new; others are old reliables which have been included because their use is still limited through lack of widespread documentation. In all cases, the programs are moderate in their intensity ratings. They are graded and, in most cases, are balanced to encompass many of the fitness components essential to health, maintaining optimum body weight, and promoting efficient movement. Activities such as rope, wand, and ball routines, as well as yoga, aerobic dance, health hustles, and weight training have been omitted from this manual because of their detailed description in other, readily available publications.

It is hoped that participation in these activities will demonstrate to students that fitness activities can be both enjoyable and beneficial to health, and will thereby encourage lifelong attention to exercise principles and practices which meet individual needs and interests.

Warm-Up

Warm-up is any mild introductory exercise which prepares the body for efficient movement during vigorous physical activity.

PURPOSE

The purpose of warm-up is to:

- increase the total body temperature;
- augment the maximum oxygen intake relative to a 'cold' start;
- reduce the likelihood of muscle tears;
- by-pass any abnormalities in heart rhythm by slowly increasing the heart rate.

FORMAT

The warm-up period should be divided into three sections:

2 - 4 min.	4 - 6 min.	5 - 10 min.
Mild - Aerobics	Calisthenics	Static Flexion

1. Mild Aerobic Exercises: Designed to mobilize the body and raise the body temperature. Activities include walking, slow jogging, skipping, cycling, and hopping type movements which utilize the large muscles of the body.

2. General Rhythmic Calisthenics: Are semi-ballistic in nature; work all major areas of the body; and put joints through 85% of their range of motion.

3. Static Flexibility Exercises: Activate muscle groups which are specific to the movement patterns of a sport. Included are static exercises which put the muscles and joints through their full range of motion.

SPECIFIC GUIDELINES

1. Mild Aerobic Exercises

   a) This is the preparation phase for a daily work-out. Start with easy jogging and alternate with slow and medium speeds.

   b) Begin to prepare a mental set for the activities ahead, make any minor equipment adjustments.

   c) As the students progress into the third and fourth minute of the mild aerobics, start to vary direction of travel and body positions (high knee stepping, side stepping, backward jogging, etc.).

   d) Try to detect any particular body areas that feel tight or might need more attention in the calisthenic and static flexion segments of the warm-up.

2. General Rhythmic Calisthenics

   a) Calisthenic exercises should work all major areas of the body and should include movements in all possible directions: forward and backward (flexion - extension); side to side (adduction - abduction); and circular (rotation).

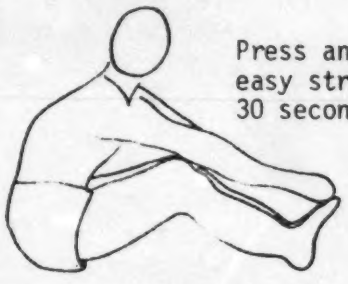
   b) Remember -- all movements must be slow and rhythmic. Avoid high speed ballistic movements which force the muscle to its extreme end-point.

   c) When executing various moves, travel only 85% of your natural movement range -- hold back 15% as a safety factor.

3. Static Flexibility Exercises

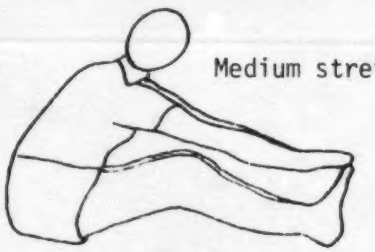
a) First Stage. . . . . start each flexibility exercise by slowly moving the desired body segment toward its final end-point of movement. Near the end of the exercise, press and slow the movement down to an easy stretch, then hold this position for 30 seconds.

Start



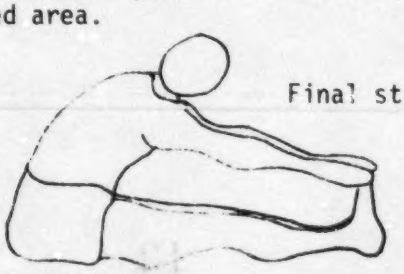
Press and hold an easy stretch for 30 seconds.

b) Second Stage. . . . . as the muscle relaxes and the feeling changes to that of a milder stretch, press a little further until the legs are at a medium stretch. Hold for an additional 30 seconds.



Medium stretch for 30 seconds.

c) Third Stage. . . . . again, as the muscle relaxes, press to a near maximum, developmental stretch and hold for a final 30 seconds. At this point a warm feeling should occur in the stretched area.



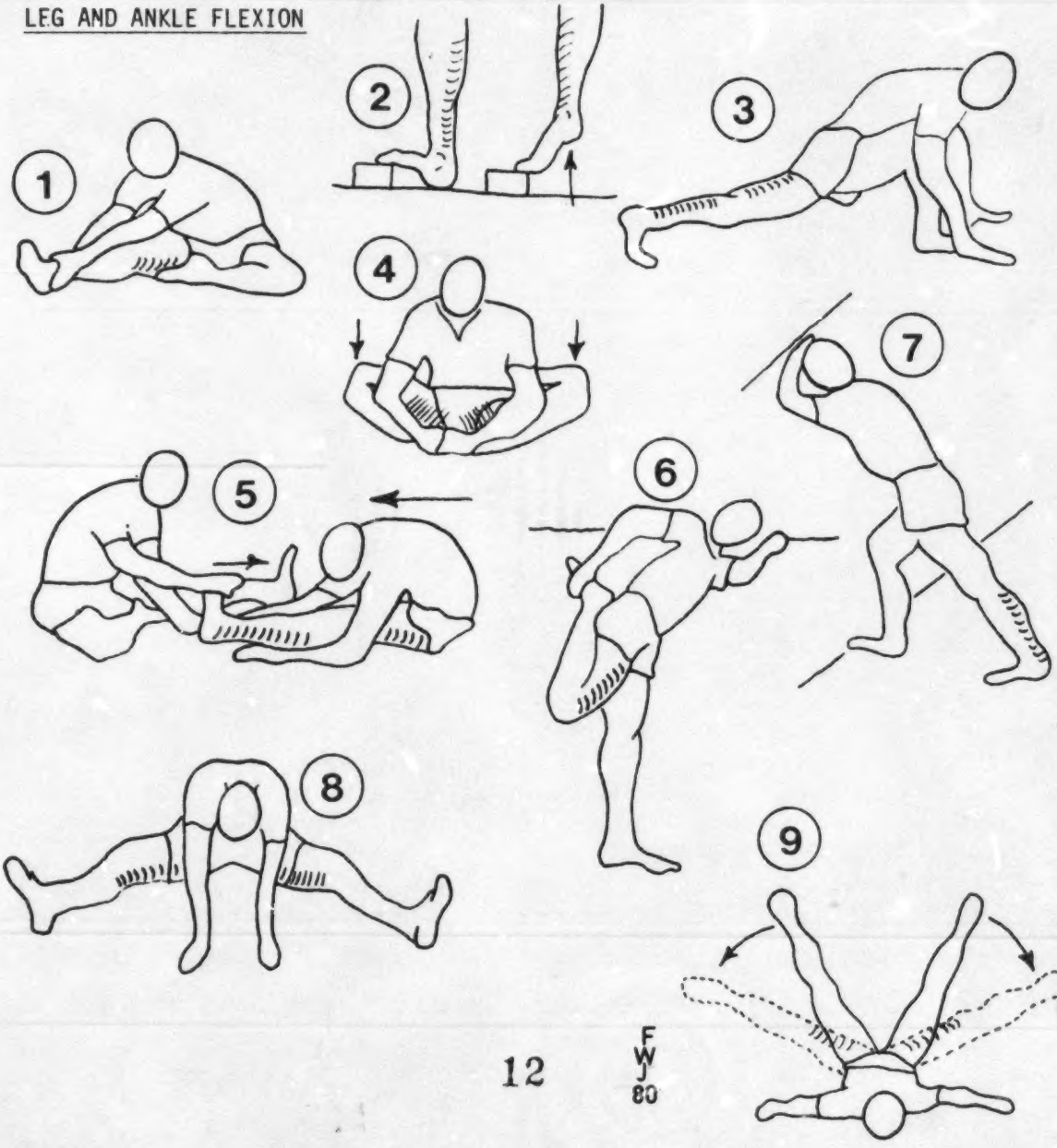
Final stretch for 30 seconds.

There is a difference between the feeling of a proper stretch and pain. Suggest to the students that they should press into the stretch by how they feel. Avoid forcing to a predetermined position. Pushing too far or hard can be injurious.

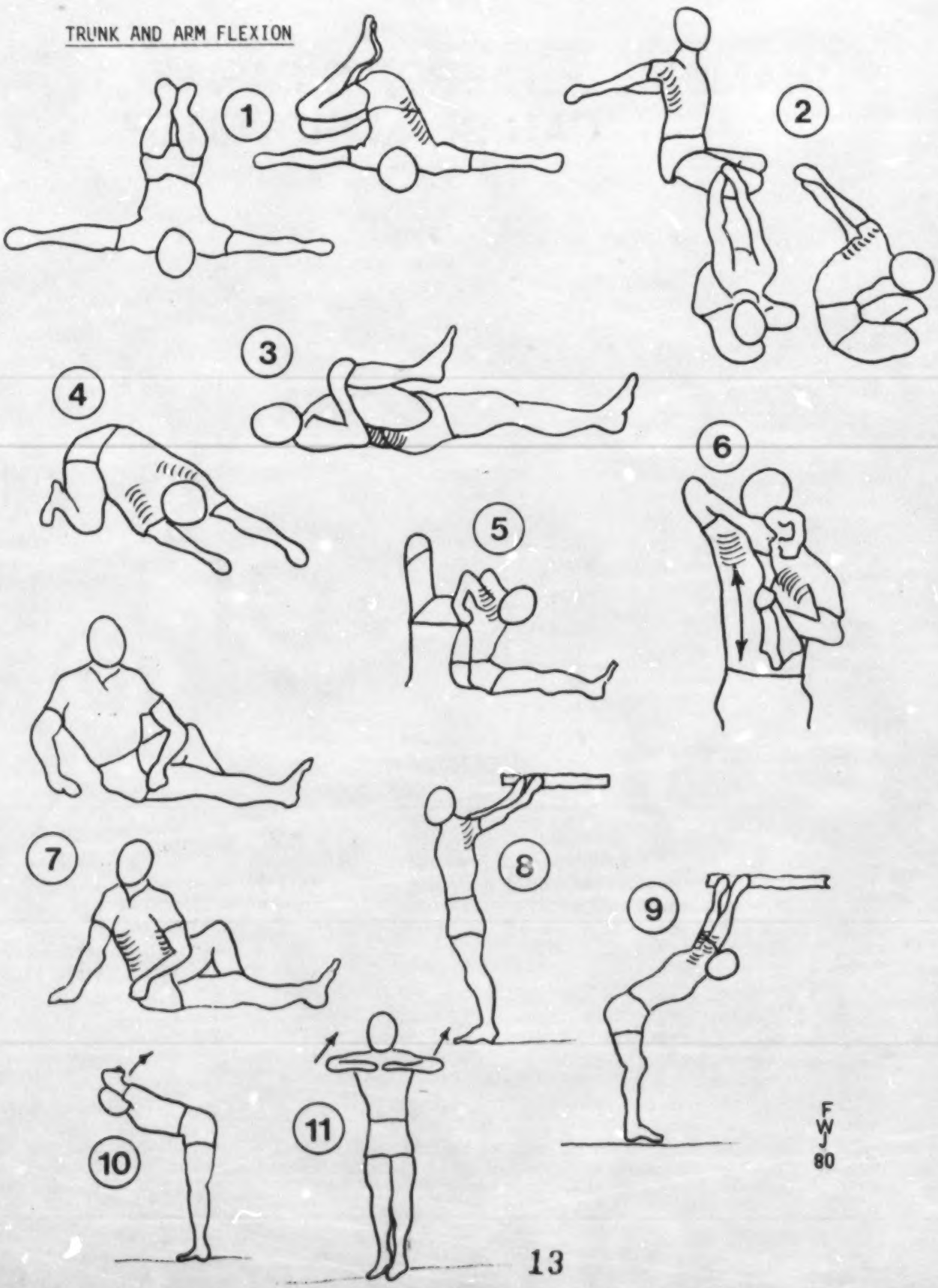
Remember, do not bob and bounce -- rather, progressively press and hold. Sudden ballistic movements which are sharp and rapid only inflame, tear, and injure the muscles and other connective fibres surrounding the joints.

After the students have completed each stretching movement, have th gently shake the area out and allow the muscle to r[illegible].

LEG AND ANKLE FLEXION



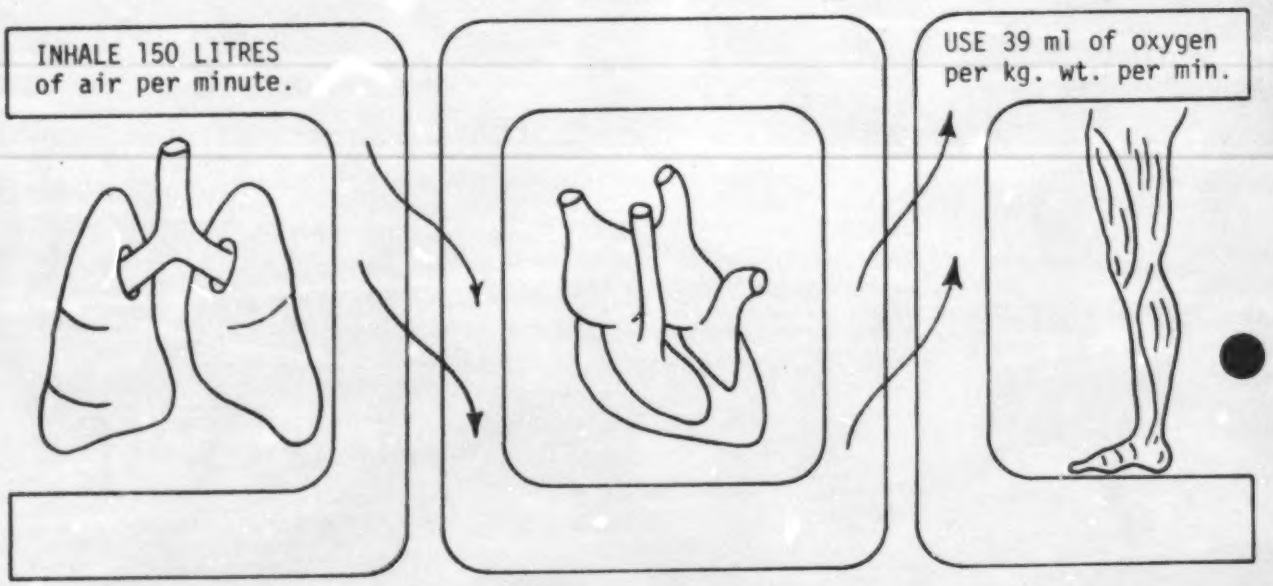
TRUNK AND ARM FLEXION



STAMINA...or...AEROBIC CAPACITY CAN BE IMPROVED BY...

Aerobic capacity is the maximum amount of oxygen that can be taken into the blood and delivered to the muscles.

For example:



Adenosine triphosphate (ATP) and creatine phosphate (CP) are the two high energy phosphate compounds which enable our muscles to sustain movement. Unfortunately, our bodies contain only small amounts of these compounds. Consequently, when our muscles are vigorously activated, the ATP-CP stores are rapidly depleted -- usually within 20 seconds.

As a means of extending the active movement period beyond 20 seconds, our bodies chemically break down glucose molecules as a means of rebuilding and re-supplying the ATP-CP phosphates. Again however, the glucose conversion process (without the presence of oxygen) can only be sustained for approximately 60 seconds, then it to breaks down.

If vigorous movement is to continue beyond 60 seconds, then ATP-CP production is dependent upon chemical reactions that utilize oxygen.

Failure to deliver an adequate amount of oxygen to the working muscles means that:

a) The muscles have to slow down their rate of contraction;

b) Our movements are not as precise as we may want them to be;

c) We appear to fatigue out faster;

d) We have a personal energy crisis!

In order for students to improve their aerobic power, they must regularly participate in vigorous physical activities which incorporate all four components of the FITT PRINCIPLE.

Simply explained, the FITT PRINCIPLE requires that a person:

Be physically active three to five times per week.	Work up to and sustain a minimum 60% pulse rate during exercise. (Refer to the Intensity Chart, page 11.)	Attempt to keep moving for at least 15 to 20 minutes. Beginners should start with Interval Training.	Participate in any large muscle activity which vigorously exercises the: - legs - arms - lungs

The two key parts of the FITT PRINCIPLE are time and intensity. The heart, lungs, and large muscles must be activated for at least 15 to 20 minutes and the pulse rate during the activation period must be above 60% of maximum. The point at which 60% activation begins is dependent upon a person's age. While numerous formulae exist for determining threshold pulse rate, a more convenient method is to refer to the age conversion intensity chart on the next page.

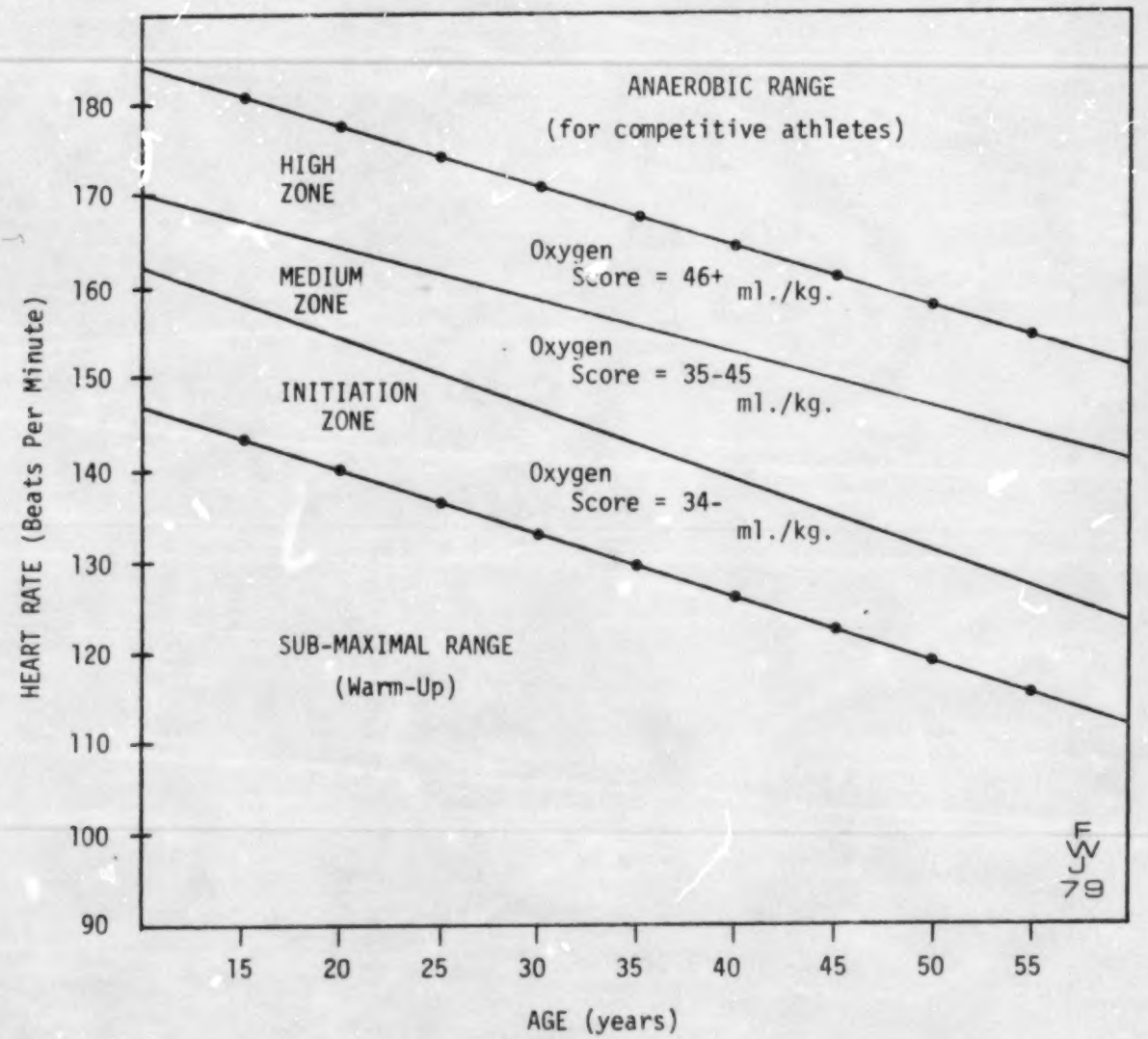
In summary: It is not enough to have your students merely run, cycle, skip, etc. They must be active three to five times per week, and at an intensity level high enough to develop the aerobic carrying capacity of the muscles and blood. This latter point must be strictly adhered to when you are planning circuits, interval, and basic workout training programs.

INTENSITY~ How hard should you exercise ?

Counting heart beats is a good method to assess response to aerobic exercise.

Count for 10 seconds immediately after stopping physical activity then find your level on the appropriate age corrected column below.

The students should be content to work at the INITIATION ZONE until their condition improves. Slowly increase the intensity for students until their heart rates reach the top of the HIGH ZONE.



Strength • Power

Resistance training (weight lifting) must be added to the program if any significant changes in strength are to be realized.

Depending on how the students lift and the equipment they lift with (Nautilus, Digger, Universal, or bar bells) the various performance components can be selectively modified to fit their individual training needs. Here is an example:

COMPONENT	RESISTANCE (% of 1. RM)	RATE	REPS	SETS	FREQUENCY (times / wk.)
STRENGTH	90 - 100	slow and hard	1 - 3	3	3
SPEED	50 - 60	quickly as possible	15 - 18	2	3 - 5
POWER	65 - 75	quick and hard	9 - 12	2	3
ENDURANCE	50 - 60	moderate and steady	until tired	2	3 - 5

THE BASIC PROGRAM

BODY AREA	EXERCISE
Chest	Bent Arm Pullover Bench Press
Shoulders	Military Press Bent-Over Rowing
Back	Wide Grip Chin-Ups Dead Lift
Arms	Forearm Rotation Biceps Curls Triceps Curls
Wrists	Wrist Curls Reverse Wrist Curls Wrist Rolling
Abdominals, Trunk	Bent Knee Sit-Ups Twisted Sit-Ups Sitting Tucks
Upper Legs	Leg Extensions Leg Curls Half Squats
Calves	Heel Raise Stair Running

Basic Fitness Workout

OBJECTIVES: Increase aerobic power, muscular endurance and strength.

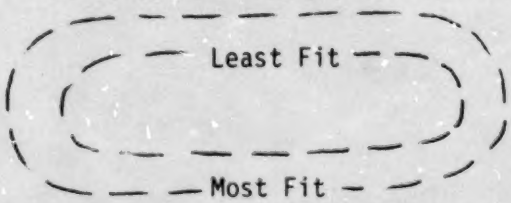
TYPE OF ACTIVITY: Continuous walking, jogging and flow-through calisthenics done in a non-stop sequence for 36 minutes.

Walking Warm-up	Stationary Exercise	Interval Jogging	Mini-Taper	Muscular Endurance	Taper Off

0 Min. 5 10 25 27 33 36 Min.

ROLE OF THE TEACHER: Gives active leadership throughout the entire sequence of workout.

CLASS FORMATION: Large circle. If you have a wide range of fitness levels, more than 25 participants, or a small exercise area -- then utilize 2 or 3 circles.



OPERATIONAL CONSIDERATIONS: Participants are permitted to move from one circle to the other, depending on whether they find the workout too hard or too easy. A decision to move should be made on the following criteria:

CRITERIA	MOVE TO THE INNER CIRCLE (Slow down the tempo if...)	MOVE TO THE OUTER CIRCLE (Speed up the tempo if...)
How the person feels (Subjective)	. Light headed or nauseous . Difficult to hold a conversation . Fingers tingling . Tunnel vision	. Breathing is easy . Able to talk excessively
The intensity of their 10 sec. pulse count (Objective)	. Person exceeds their upper limit pulse count	. Pulse count falls below the aerobic threshold level
Professional judgement of teacher	. You notice participant experiencing difficulty	. Person is moving faster than group (with ease) . Person appears not to be putting effort into workout

SEQUENCE OF EXERCISES

A. Walking Warm-Up - Duration 5 minutes (20 to 30 seconds each exercise)

1. Walk in a clockwise direction and roll shoulders forward and backward
2. Walk with hands behind head - rotate upper body left and right.
3. Jog - 30 seconds
4. Walk - cross body arm swinging
5. Jog - 30 seconds
6. Walk - shake legs
7. Jog - 30 seconds
8. Walk - double arm pumping
9. Change direction and jog - 30 seconds.
10. Walk - on toes
    - on heels
11. Side step jog - 15 seconds (right foot lead), change to 15 seconds (left foot lead)
12. Walk - arm circles forward and backward
13. Walk - shake arms and legs

B. Stationary Exercises - Duration 5 minutes (20 to 30 seconds each exercise)

1. Shoulder rotation (right and left)
2. Arm flexion
3. Hip bending (forward and backward, then side to side)
4. Alternate toe touch
5. Knee bends
6. Heel raise
7. Jog on spot (30 seconds)
8. Alternate toe hopping (5 times each foot)
9. Sitting - side trunk bending
10. Sitting - body twist
11. Back lying - alternate leg cross-overs

C. Aerobic Power - Duration 15 minutes

1. Interval jogging for 2.5 minutes and walk for 30 seconds (repeat 5)

D. Mini Taper-Off - Duration 2 minutes

1. Jog on spot (30 seconds)
2. Knee bend, toe touch, shoulder pull back
3. Alternate elbow touch and knee lift

E. Muscular Endurance - Duration 6 minutes

1. Bent knee sit-ups
2. Push-ups
3. Prone position - double leg raise
4. Twisted bent knee sit-ups
5. Burpees (squat thrust)
6. Sitting tucks
7. Side leg raise

F. Taper-Off - Duration 3 minutes

1. Bent knee monkey slouch
2. Slow walk - breathe deeply
   - shake arms and legs
   - double arm pumping

Related References

Fitness Finders and the National Board of YMCA's (U.S.A.). Fitness For Junior High Schools (Spring Arbor, Mich.: YMCA, 1976)

Myers, C. R., et al. The Y's Way to Physical Fitness (Emmaus, Penna.: National Council, Rodale Press, 1973.

Stothart, John. Shape Up and Live (Edmonton, Alta.: Hallomshire Publishers Ltd., 1975)

President's Council • Interval Program

The following interval training program was designed in the U.S. by the President's Council on Physical Fitness and Sports. It was created as a method of initiating interval training techniques in a class where time is limited and relatively large numbers of students have to be handled. It is not intended as a competitive training program even though the basic principles are the same.

PRE TESTING FOR TIME

1. Have the students perform a 1500 metre run-walk.

2. Group the students according to the performance time listed in the left-hand column of the 1500 Metre Run/Walk Chart.

   The results of these tests can also be used as a baseline evaluation for determining the success of the program if the test is repeated following the training.

IMPLEMENTING THE PROGRAM

1. The 1500 Metre Run/Walk Chart lists the target times for three different distances in each performance category. Have each student select a distance in their category and run that distance in the time listed. The number of repetitions and the duration of the recovery interval is given at the bottom of the chart under 'Beginners' Programs'.

2. The training distances can be interchanged from session to session, but it is recommended that students perform the 200 metre program for the first few training sessions.

3. As the student's physical condition improves, the intensity of the program can be increased by:

   a) increasing the number of repetitions;
   b) increasing the speed of the run;
   c) reducing the time of the recovery interval.

4. The average time for performing any of the beginning programs is from 12 to 16 minutes, depending on the distance.

5. Chart I is a suggested Interval Running Record Form to be used by each student. This will allow students to observe their own progress and permit the teacher to detect problems readily.

1500 METRE RUN-WALK CHART

Performance Time Groupings		Interval Running Pace Schedule in Seconds		
Group	Time: (Min:Sec)	200 Metres	300 Metres	400 Metres
1.	4:25 - 4:39	30-32	48-51	66-70
2.	4:40 - 4:54	32-34	51-53	70-74
3.	4:55 - 5:09	34-36	53-57	74-78
4.	5:10 - 5:24	36-38	57-59	78-82
5.	5:25 - 5:39	38-40	59-62	82-86
6.	5:40 - 5:54	40-42	62-65	86-90
7.	5:55 - 6:09	42-44	65-68	90-94
8.	6:10 - 6:24	44-46	68-70	94-98
9.	6:25 - 6:39	46-48	70-73	98-102
10.	6:40 - 6:54	48-50	73-76	102-106
11.	6:55 - 7:09	50-52	76-78	106-110
12.	7:10 - 7:24	52-54	78-81	110-114
13.	7:25 - 7:39	54-56	81-84	114-118
14.	7:40 +	56 +	84 +	118 +

Beginners' Programs

200 Metre - Run 6 to 9 repetitions, with a 1 minute jog/walk recovery interval between each.

300 Metre - Run 4 to 7 repetitions, with a 1 minute and 25 seconds jog/walk recovery interval between each.

400 Metre - Run 3 to 5 repetitions, with a 2 minute jog/walk recovery interval between each.

CHART I

INTERVAL RUNNING RECORDING FORM

DATE	FAST RUN DISTANCE	NUMBER OF FAST RUNS	TIMES FOR EACH FAST RUN	REST INTERVAL TIME

Example: Assuming a 1500 metre run time of 6:45 . . .

DATE	FAST RUN DISTANCE	NUMBER OF FAST RUNS	TIMES FOR EACH FAST RUN	REST INTERVAL TIME
5/27	200	8	49, 50, 49, 49, 48, 49, 49, 48.	1:00

Testing Results:

	1500 m. Run # 1	1500 m. Run # 2	1500 m. Run # 3
Date:			
Time:			

Pace Training Intervals

Children are well adapted to running because their everyday play is a form of interval training -- combining moderate motion with frequent short bursts of speed.

Children,however, do have to be taught how to pace, as most think of running only to beat someone in a race or to get somewhere in a hurry. They need to learn to judge their speed so they can follow a pace for a length of time long enough to produce a training effect (i.e.,walking, jogging at 10% or 20% effort, running at 40% or 60% effort, and sprinting at 100% all out effort).

Interval training can utilize pace in a number of ways as follows:

1. Establish a course with four sections of equal distance (i.e., one hundred metres). Have children jog one section, walk one section, jog one section, walk one section, and so on for a period of 15 minutes.

2. Establish a course with sections (possibly 50 metres each). Have children walk one section, jog the second section and run the third section. Repeat for 15 minutes.

3. Establish a course with no marked sections and have the children walk and jog for time (i.e., walk 30 seconds, jog 30 seconds, repeat 10 to 15 minutes).

4. Establish a circular course without marked sections. Have children grouped in pairs. One partner jogs and the other walks. When the jogger catches up to the walker, they switch paces.

5. Progression can be added in the following manner:

   a) increase the number of repetitions;
   b) increase the speed of the pace;
   c) decrease the distance or time of the walking interval;
   d) increase the distance or time of the running interval.

CIRCUIT TRAINING

Strength, power, and muscular endurance can only be improved if you gradually and methodically:

1. increase the number of exercise repetitions;
2. add to the exercise load to be lifted;
3. decrease the exercise time.

One of the preferred ways of controlling all three of these variables is to group your exercises into a non-stop, progressively controlled sequence called circuit training.

Progression on a circuit is measured, initially, by decreasing time of performance, and secondly, by increasing the loads and/or repetitions.

Circuits enable large numbers of students to proceed from one exercise to another without undue local fatigue, or at a work rate compatible with each student's capacity.

The value of circuit training lies in its adaptability to varying school situations. The lack of equipment and apparatus with which to compile a circuit is not a crippling factor but merely a limiting one. Circuits may be designed to utilize an entire physical education period, or merely ten minutes of it, thus allowing enough time for both fitness training and skills training in the class period.

Power Circuit

A. BEFORE THE TRAINING PROGRAM STARTS

Determine the training dosage for each student. This is done in the following manner:

1. On the first day of the program, the students perform each circuit exercise for one minute. Working at maximum pace, they try to do as many repetitions as possible. If they stop because of fatigue before the minute is up, THEY DO NOT RESTART!
2. At the end of one minute (or at fatigue), stop and have each student record the number of exercise repetitions that they successfully achieved.
3. Take a one-minute rest after each activity before moving onto the next exercise.
4. Once the students have completed all the exercises in this manner, have them divide their scores by two. The resulting answers indicate the training dosage for the next two-week period (approximate).

   For example:

   Chair Dips 48 (repetition score) divided by 2 equals 24 (training dosage).

B. PERFORMING THE CIRCUIT

1. Every other day, have students perform each exercise at the prescribed training dosage.
2. Have students complete the entire series of exercises three times, with as little rest as possible.
3. At the completion of the third set, have the students record their total work-out time.
4. Each day, encourage them to complete the exercise circuit in less time than the day before, remembering to maintain their training dosage.
5. Their goal is to complete three laps of the circuit in two-thirds of their original time. For example, if it took 15 minutes to complete the exercises on the first day, then their goal is to complete the three laps in ten minutes (15 minutes multiplied by two thirds).
6. When the two thirds goal is reached, it is time to re-test the students' one minute capacity on each exercise, divide by two, and readjust the workout speed to meet the new workout level.

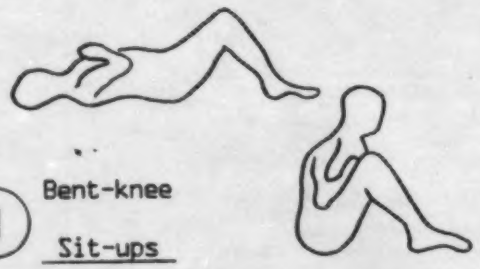
POWER CIRCUIT

NAME: _____. DATE: _____.

ITEM	SERIES - 1		SERIES - 2		SERIES - 3		SERIES - 4	
	MAX REP	TR DOSE	MAX REP	TR DOSE	MAX REP	TR DOSE	MAX REP	TR DOSE
1. Bent Knee Sit-ups	38	19						
2. Chair Dips	24	12						
3. Star Jumps	30	15						
4. Twisted Sit-ups	24	12						
5. Heel Raise	48	24						
6. Push-ups	32	16						
7. Chest Raise	26	13						
8. Bench Step-ups	21	11						
9. Double Leg Raise	29	15						
10. Double Leg Rope Skipping	51	26						

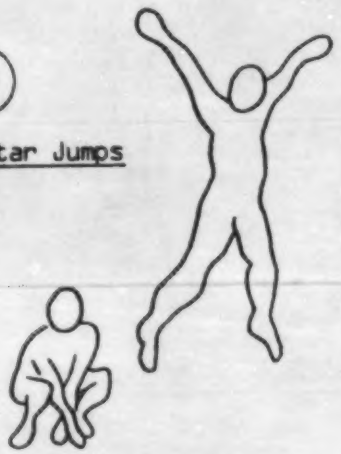
SERIES	TIME FIRST DAY	TARGET TIME	TRAINING DAYS 1	2	3	4	5	6	7	8	9
FEB-16 1.	21:05	14:00	21:05	19:45	19:30	19:20	18:30	17:40	17:05	16:30	15:00
2.											
3.											
4.											

POWER CIRCUIT

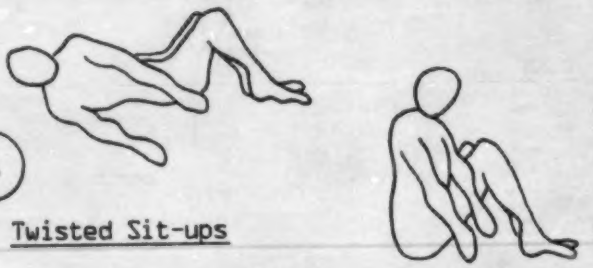


1 Bent-knee Sit-ups

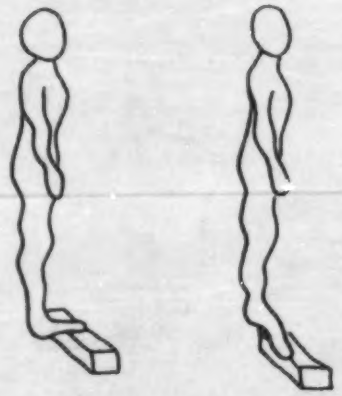
2 Arm Dips



3 Star Jumps



4 Twisted Sit-ups

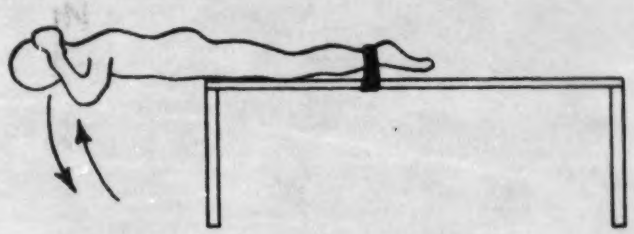


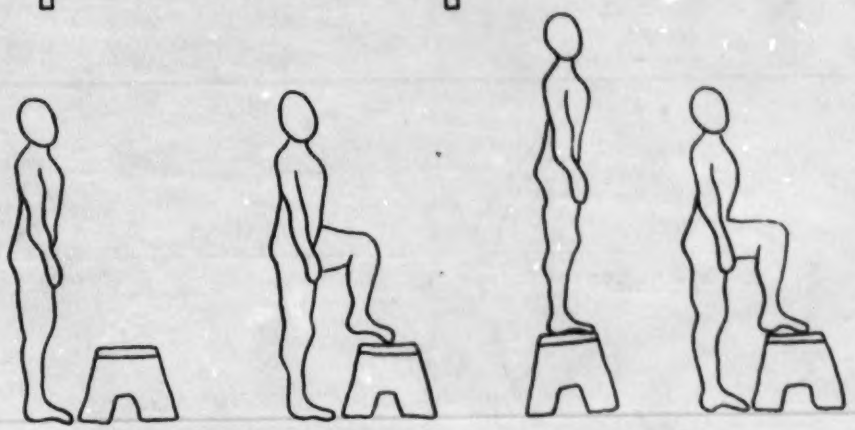
5 Heel Raise

6 Push-ups

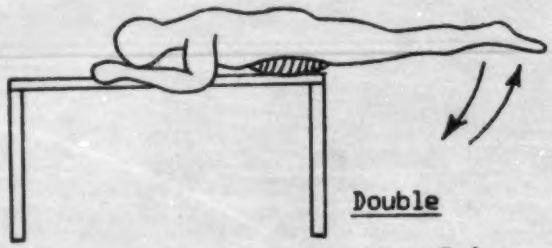
CIRCUIT CONT'D.

7 Chest Raise



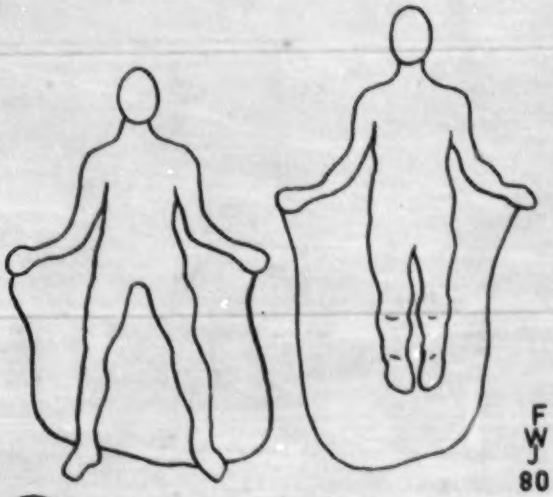


8 Bench Step-ups



Double Leg Raise

9



F W J 80

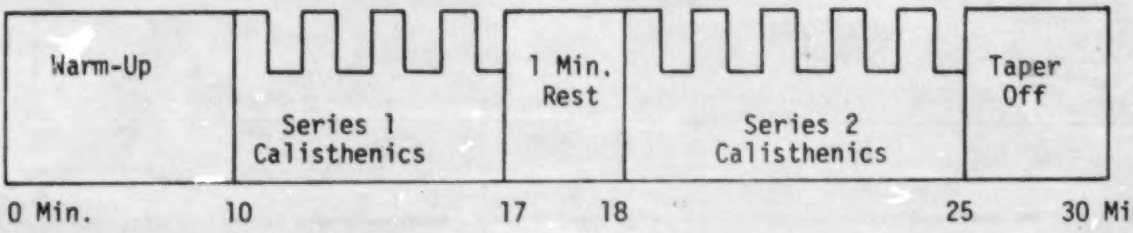
10 Double Leg Rope Skipping

Fixed-Time Circuit

Objectives: To improve flexibility, power, and muscular endurance.

TYPE OF ACTIVITY: This circuit exercises the students at maximum capacity for a pre-set period of time (30 seconds of exercise and 20 seconds of rest per station). The advantage is that everyone starts and finishes at the same time, thereby allowing for better class control and lesson plan structure.

The program begins with a standard 10-minute warm-up (jog, bend, twist, and stretch) followed by two series of interval calisthenics. Each series consists of 8 exercises.



OPERATIONAL CONSIDERATIONS

1. Progression

Every three weeks, the instructor should plan to increase the intensity of the calisthenics to meet the changing needs and ability levels of the students. This can be done in the following ways:

a) reduce the rest interval from 20 to 15 seconds;
b) increase the work time from 30 to 40 seconds;
c) add more resistance to each exercise;
d) replace easy exercises with more difficult ones.

2. Mid-Series Rest

Once the students have completed the first series of calisthenics, they are given a one-minute rest period. This gives the instructor the opportunity to make general corrections, give encouragement, etc. When the circuit program has been in operation for a few weeks, this rest period can be reduced or eliminated, thereby further contributing to the overload progression of the program.

OPERATIONAL CONSIDERATIONS cont'd.:

3. Recording Procedure

A recording sheet containing every students' name is attached to the wall beside each exercise station. At the end of every 30 second calisthenic interval, the students write down the number of completed repetitions beside their name. This station-by-station multiple recording sheet allows the instructor to scan the complete class list and make quick comparisons re: progress, difficulty, etc.. An alternative is to use individual score cards which the students carry with them throughout the circuit.

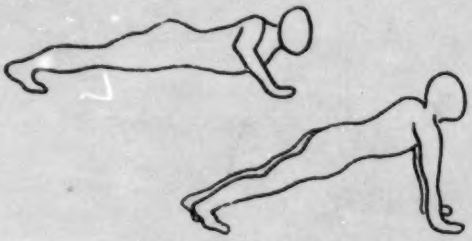
Example:

STATION # 2 BENT KNEE SIT-UPS

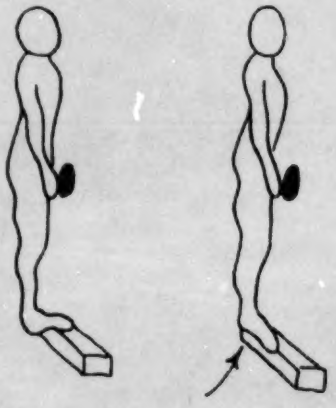
Name	Series	Day							
		1	2	3	4	5	6	7	8
Jim Anderson	A	21	22	24	-				
	B	23	23	24	-				
Martha Greene	A	16	17	19	20				
	B	18	20	21	20				
Richard James	A	25	26	27	29				
	B	25	29	30	29				

FIXED TIME CIRCUIT

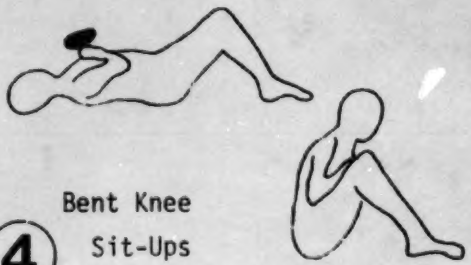
Push-Ups 1



2 Elevated Heel Raise

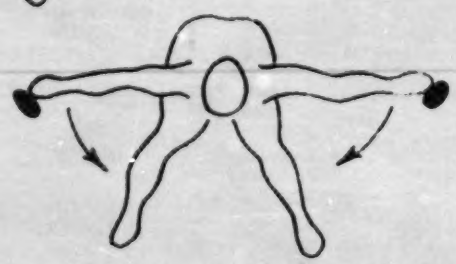


Bench Dipping 3

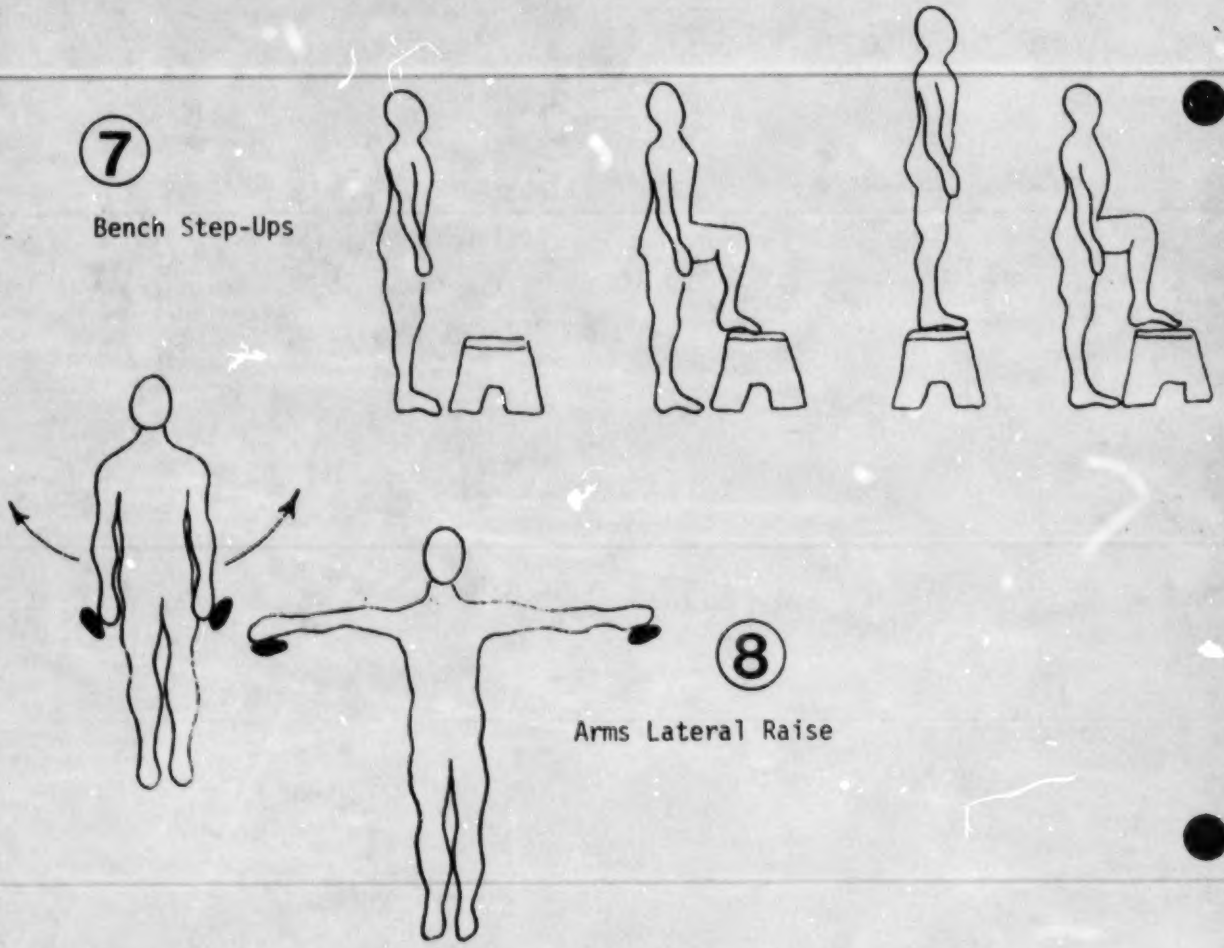


4 Bent Knee Sit-Ups

5 Bent Over Lateral Arm Raise



Wrist Rolling 6



⑦ Bench Step-Ups

⑧ Arms Lateral Raise

Other Circuit Training Exercises

1.	Elevator Push-Ups	1.	Squat Jumps
2.	Bench Stride Jumps (5 lbs.)	2.	Two Arm Curl
3.	Prone Chest Raise	3.	Bench Stride Jumps
4.	Twisted Sit-Ups	4.	Dumbell Swings
5.	Rope Skipping	5.	Lying Lateral Raise
6.	Wrist Rolling (10 lbs.)	6.	Bent Knee Sit-Ups
7.	Star Jumps	7.	Stair Running
8.	Bent Knee Sit-Ups (5 lbs.)	8.	Single Leg Push-ups

Possible Weight Training Circuit Exercises

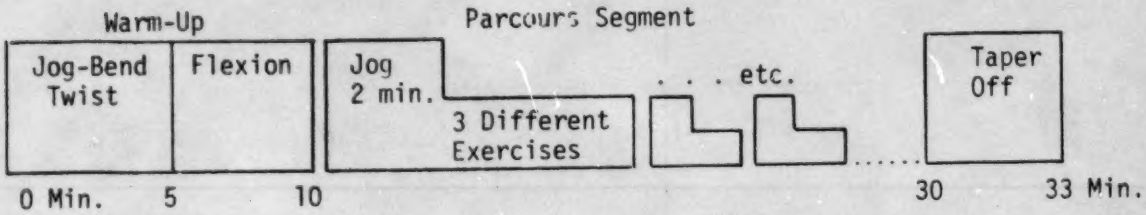
If you plan to use weight training exercises in your circuit training program, here is a suggested scaling of resistance loads (in kilograms) for high school students by grades:

EXERCISE		GRADE					
		7	8	9	10	11	12
Military Press	M	10	14	16	16	18	20
	F	7	9	10	10	14	16
Standing and Prone Lateral Raise	M	2	3.5	4.5	4.5	4.5	7
	F	2	2	3.5	3.5	4.5	4.5
Bent Over Rowing	M	14	16	18	25	25	27
	F	9	10	14	18	18	20
Bench Press	M	16	18	20	22.5	22.5	25
	F	9	10	14	16	18	20
Two Arm Curl	M	10	14	16	18	18	22.5
	F	4.5	7	9	10	14	16
Straight Arm Pullover	M	4.5	7	9	10	14	14
	F	2	4.5	4.5	7	9	9

Indoor Parcours

OBJECTIVES: Increase flexibility, aerobic power, and muscular endurance.

TYPE OF ACTIVITY: Preliminary bending, twisting, and flexibility warm-up followed by a series of jogging and calisthenic exercises which can be repeated four or five times.



ROLE OF THE TEACHER: Gives active leadership throughout entire sequence of workout.

OPERATIONAL CONSIDERATIONS

1. Warm-up - Follow the guidelines suggested on pages 2 to 4.

2. Parcours Segment

   a) The class begins by jogging for two minutes around the perimeter of the activity area. Distance jogged should approximate 300 to 400 metres.

   b) On completion of the two minute jog, the instructor stops the group and quickly demonstrates three calisthenic exercises.

   c) The participants then perform as many repetitions of each exercise in three, 30 second periods.
   Note: each 30 second period flows directly into the next -- there are no rest periods.

   i.e., knee bends (30 seconds) followed by push-ups (30 seconds) then prone chest raises (30 seconds).

   d) At the end of the third exercise, the group is given a 15 second walking rest period.

   e) The participants then jog another two minutes followed by a different combination of calisthenics and 15 second walking rest period. This jog and calisthenic sequence is repeated at least five times.

3. Taper Off - The parcours activity ends with a three minute general bend, twist and walk series of movements. Heart rate during this segment should slow down to 120 beats per minute.

SEQUENCE OF EXERCISES

Series A - Jog 2 minutes.

- Bent Knee Sit-Ups (30 sec.)
- Push Ups (30 sec.)
- Back Arch, Head Raise (30 sec.)

Series B - Jog 2 minutes.

- Twisted Sit-Ups (30 sec.)
- Burpees (30 sec.)
- Side Leg Raise (30 sec.)

Series C - Jog 2 minutes.

- Sitting Tucks (30 sec.)
- Prone Leg Raise (30 sec.)
- Single Leg Push-Ups (30 sec.)

Series D - Jog 2 minutes.

- Bent Knee Wall Sits (30 sec.)
- Stride Jumps (30 sec.)
- Single Leg Squats (15 sec. and 15 sec. - L. and R. leg)

Series E - Jog 2 minutes.

- Sitting Alternate Toe Touching (30 sec.)
- Standing Knee Bend - Toe Touch (30 sec.)
- Alternate Elbow Touch - Knee Bend (30 sec.)

Taper Off Activity - Slouch and Knee Bend
- Hip Rotation
- Side Lunge
- Jog on the Spot

Pony Express NEW

This is an educational circuit which gives every student a turn at designing and leading one (or more) 40 second exercise segment.

CLASS FORMAT:

The first 15 minutes is devoted to group planning, practice, and teacher instructions. The second 15 minute segment is the actual doing of the circuit. Rotations on the circuit are every 40 seconds.

INTRODUCTION	PLANNING			OPERATION
Organization Into Groups	Planning the Workout	Individual Practice	Final Teacher Instructions	Pony Express Circuit (Change every 40 sec.)

0 min. 4 10 12 15 30 min.

ROLE OF TEACHER:

Explain planning and operational procedures to the groups. Coordinate timing of each planning segment and 40 second exercise segment. Aid students in evaluating the program (to be done on the second day of the program).

PLANNING PROCEDURES: (15 minutes)

1. Divide the class into four equal groups of five to eight students each. Locate each group in a different corner of the gymnasium.

2. Each group has six minutes to sit down and design a balanced exercise workout. Every student must suggest one exercise which (s)he will later be called upon to demonstrate and instruct to each of the other assigned groups.

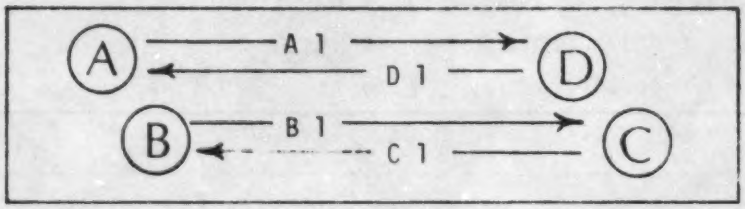
   The planning process must insure that the three essential fitness components are contained in the program:
   - Suppleness (bend, twist, flexion) - 30%
   - Stamina (aerobic power) - 40%
   - Strength (also muscular endurance)- 30%

   At the beginning of the planning process, the students in each group will have to decide who is going to lead suppleness, stamina, and strength.

OPERATIONAL PROCEDURES

1. On a whistle command from the teacher, the first 40 second exercise segment starts.

   The first members from groups A and D run across the floor and exchange places (similarly with groups B and C). When these first members arrive at their new groups, they demonstrate an exercise to all numbers in the new group.



   NOTE: At this point, all four groups are in motion, doing something different, with a different leader.

2. Each member of the group then performs the demonstrated exercise until the teacher again blows the whistle -- indicating that the exercise stops and the leaders return to their original groups.

3. As the first leader is returning home, the second member of each group runs to the same group (A⇄D and B⇄C) and demonstrates the next 40 second exercise. Students perform the exercise as in (2) above.

4. This rotation of leaders continues until every student has taken their 40 second turn at instructing.

COMMENT:

As can be seen, many combinations can be used in the change process -- depending on the size of the class, number of groups, and the availability of time.

The main point of this activity is that every student has a turn at being the leader, each group is 'visited' by many leaders and thereby has the opportunity to try many exercise variations, and all students have the opportunity to be part of an exercise planning process.

Desk Top Roulette NEW

Desk Top Roulette is a classroom circuit training program which is totally designed by the students as part of a class project.

Duration of the program is 10 to 15 minutes. It is suited to small room areas and to schools which have daily classroom physical activity periods.

Equipment and supplies needed include:

1. 1 set of 8½ X 11 cards (five different colored cards per set);
2. Pen, pencil, crayons/ink marker;
3. Tape recorder or record player;
4. Tapes or records with appropriate jogging tempo music.

PREPARATION:

Start the project by having each student write down any five stationary calisthenics which will promote:

1. Aerobic Power;
2. Flexibility (any joint area);
3. Leg strength;
4. Arm or Shoulder strength;
5. Abdominal or Back strength.

Choice of exercises should be based on information which the students have received in previous health and physical education classes.

When the lists are completed, have the students draw the exercises onto color coded Desk Top Roulette Cards, as illustrated below.

_____ Title

_____ Diagrams

_____ Description of Exercise

Red card - heart and lung exercise
Yellow card - flexibility exercise
White card - leg strength exercise
Blue card - arm strength exercise
Green card - abdominal strength exercise

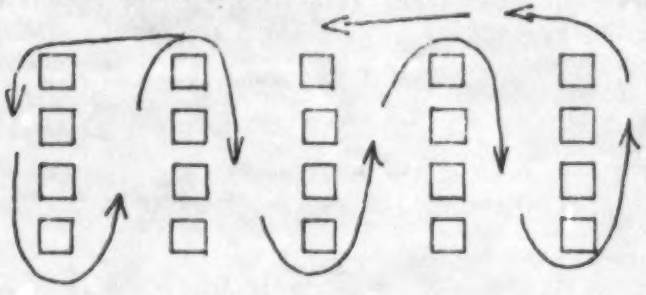
PREPARATION, cont'd.

Once the project is completed collect the Roulette Cards, check the diagrams for safety and degree of difficulty, and shuffle the Roulette Cards into a randor pile ready for use in the circuit.

IMPLEMENTATION

1. Place one Roulette Card face down on each classroom desk. Cards should be distributed randomly and color coding should represent a somewhat balanced mix of all five types of exercise.

2. Turn the music on and instruct the students to jog in a line up and down the aisles between the desks.



NOTE: Vary the duration of the jogging between 30 and 90 seconds.
After every third running sequence, change the direction of the jog.

3. When the music stops, each student:

   . Goes to the desk ON THEIR LEFT;
   . Turns over the Roulette Card on that desk;
   . Performs the described exercise for 30 seconds.

4. Resumption of the music is the signal to:

   . Stop the calisthenics;
   . Replace the Roulette Card face down on the desk;
   . Resume jogging.

5. Continue to stop and start the music until every student has had the opportunity to perform eight or ten calisthenics from the random selection of Roulette Cards on the desks.

Remember: At the end of each exercise session, reshuffle the Roulette Cards to insure a new selection of exercises for the next day's program.

Aquabics

Exercising the body in the water is not a new concept. Information from ancient manuscripts tells of people gaining therapeutic value from the thermal baths of Rome, Naples, Baiae, and Puteoli as early as 33 B.C. In the middle centuries, it become fashionable to travel to natural mineral water springs -- the earliest and most famous being located in the town of Spa, Belgium, in 1326.

During the past 30 years, two North American physical educators have been credited for re-popularizing this most ancient of exercise techniques. They are Dick Lough of Toronto and T.K. Cureton of Urbana, Illinois.

Contained on the following pages is a summary of their techniques. Undoubtedly, the teacher will be able to add countless other supplementary exercises to suit the particular needs and preferences of the class.

OBJECTIVES: Increase flexibility, aerobic power, muscular endurance, and co-ordination.

TYPE OF ACTIVITY: A combination of standing shallow water calisthenics, kicking drills and interval swimming.

Bobbing, Kicking, Individual Activity	Shallow Water Leg & Arm Calisthenics	Leg Kicking (hold edge of pool)	Swimming (widths, lengths)	Recreational Games

0 Min. 5 15 20 25 35 Min.

SEQUENCE OF EXERCISES

A. Introductory Activity - Duration 5 min.

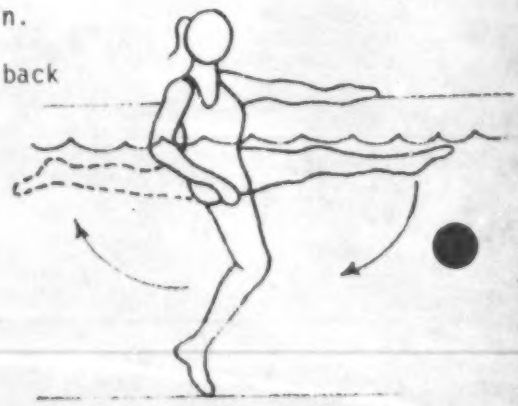
. Free play

. Organized tag games

. Bob breathing

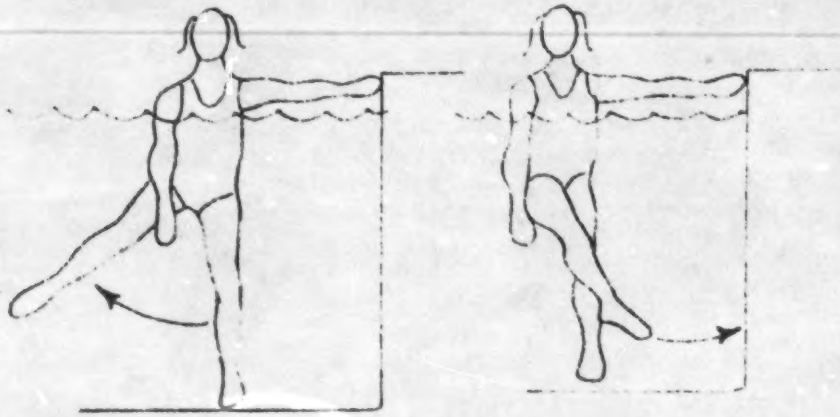
B. Shallow Water Leg Calisthenics - Duration 5 min.

. Football Kick - full leg moving forward and back
Maintain balance with arms.



. Alternate knee raising to chest - standing position
- continue while walking across the pool

. Holding onto edge of pool, straight arm and facing sideways
a) Raise outer leg in front of you and bend knee. Cross this leg in front to touch the wall with the toes. Repeat four times each side.



b) Raise the left leg forward, circle the leg to the back and return to standing position. Repeat four times each side.

c) Raise left leg to the side, pull with the heel. Then, vigorously push down and return leg to standing position. Repeat eight times each side.

C. Shallow Water Arm Calisthenics - Duration 5 min.

. Basic position for these exercises is standing in shallow water with one leg bent out in front while the other is placed straight out behind. From this position, submerge the body so that the water is up to the neck.

. Raise the arms straight out to each side (palms down and fingers apart). Keeping the arms stiff, pull the water straight down to the sides. Repeat this action quickly for 30 seconds.

. Raise the arms sideways to the surface (palms facing front). Pull the arms forward (keeping them just below the surface) then backwards as far as possible. Repeat for 30 seconds.

. Maintaining the bent leg standing position, move the arms as if doing the front crawl stroke, back stroke, and butterfly stroke.

. Keeping the arms straight, make small circles under the water (forward, down, backward, and up). Repeat for 30 seconds.

D. Swimming Widths of the Pool - Duration 5 min.

. Use the following positions and strokes:

a) prone position and leg kicking;
b) prone position and arms only crawl stroke;
c) kicking on the back;
d) crawl stroke and hold the breath;
e) swim underwater;
f) prone position and breast stroke kick;
g) sculling on the back;
h) crawl stroke.

E. Leg Kicking (holding edge of pool) - Duration 5 min.

. Include the following:

a) flutter kicking - 15 seconds each, slow, medium and fast;
b) scissor kicking;
c) frog or whip kicking;
d) flutter kicking on your back;
e) frog or whip kicking on your back;
f) bob breathing 15 times.

F. Recreational Games - Duration 10 min.

. Immunity Tag - The instructor calls out the name of a certain part of the body which must be out of the water to prevent being caught (e.g., one arm, one foot, etc.).

. Water Pom Pom Pullaway - One swimmer takes position in middle of pool. Remaining class have to swim to other side of pool. Any swimmer caught by "It" has to remain in middle of pool and try to help catch the others.

F. Recreational Games cont'd.

. Water Push-Ball - Is played with a large ball, two to four feet in diameter. Teams are lined up facing each other as in water polo. At the blow of the whistle, the players rush to the ball in the centre of the pool and try to push it to the opposite goal. Out-of-bounds balls are thrown in by the nearest player on the team opposite to the one who pushed it out.

. Leapfrog Relay - The last player in each line starts and leaps over the others in line. As soon as the front goal is reached "Go" is yelled out and the next player in line goes forward. Each time a player comes forward the line moves backward the space equivalent to one player.

. Water Volley Ball - A rope is stretched across the shallow end of the pool about three feet higher than the head. The object is to keep the ball bounding back and forth across the rope without falling into the water. The team missing the ball or failing to put it across is allowed to serve. The ball is put into play immediately by the nearest player from any position. Score is kept for both sides and the first team to reach twenty points wins.

Related References

Richard Lough and David Stinson, Aquabics (Toronto: Fitzhenry and Whiteside, 1973).

T.K. Cureton, Fun in the Water (New York: Association Press, 1949).

National YMCA, Your Swimming Pool, YMCA of Canada, 1958.

Advanced Aquabic Programs

. Interval Training
(Courtesy: K. Simison, YMCA, Windsor, Ont.)

. Deep Water Exercises
(Courtesy: T.W. Connoly, YMCA, Vancouver)

. Deck Exercises
(Courtesy: T.W. Connoly, YMCA, Vancouver)

. Aerobic Swimming
(Courtesy: Dr. K. Cooper, Dallas, Texas)

Interval Training (swimming)

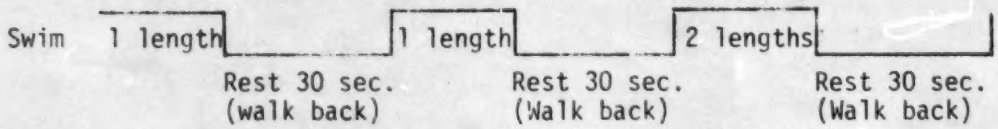
BASIC INTERVAL TRAINING

Swim one length of the pool. Stop and rest for 30 seconds. Continue to repeat this sequence.

To increase the stress:

a) decrease the time required to swim each length;

b) increase the distance of each swim between rest intervals, e.g., swim two lengths, rest 30 seconds.



PYRAMID TRAINING

At the start of each interval add one length. Work up to a maximum number of lengths (i.e., 1, 2, 3, ...8), then reverse the procedure.

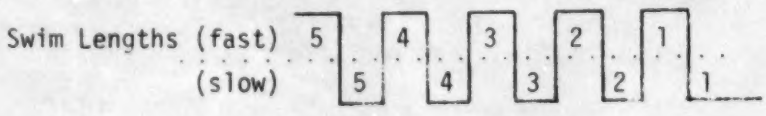
N.B. This is an advanced conditioning technique, not to be done in initial stages of conditioning.

Swim (lengths)	1	2	3	4	3	2	1
Rest (seconds)		60	60	60	60	60	60

LOCOMOTOR

This one is tough! Make sure you warm-up first.

Start with a maximum number of lengths, e.g., five. Swim these as fast as possible. Then repeat slowly as a resting interval. Next, repeat with four lengths, and so on. As the distance decreases, try to increase your speed. These are to be swum continuously.



START INTERVALS

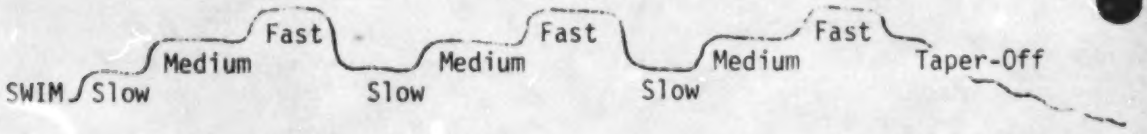
Instruct the students to swim 100 yards in any time they wish.... rest until the start of the second minute -- then repeat the 100 yard swim -- rest until the start of the fourth minute. Repeat for a minimum of 10 minutes and preferably 20 to 30 minutes. The faster they swim, the more rest time they are allowed before the next starting time.

Distance	100 yards. . .	100 yards. . .	100 yards. . .	100 yards. . .
Time	0	2	4	6

FARTLEK TRAINING

Determine the duration for the workout, e.g., 30 minutes. The goal is to swim as far as possible in the set time limit. Instruct the students to vary the speed as is necessary, slowing the pace when tired, and increasing the speed when rested. Sprint occasionally. NO STOPPING!

To add variety, change strokes, styles or drills often. Finish by tapering-off with a few slow laps and bob breathing at pool side.



PARTNER INTERVALS

Both swimmers begin at the same point. Swimmer A swims one length. When (s)he touches the end, swimmer B departs. Swimmer A is now resting as swimmer B swims. When swimmer B reaches the end, swimmer A again swims and B rests. Continue in this manner varying the strokes for 20 to 30 minutes.

Swim	A	B	A	B	A	B	A	B	A
Rest	B	A	B	A	B	A	B	A	B

THREE PERSON RELAY

Position swimmer A and C at one end of the pool, and swimmer B at the other end. A starts. When (s)he reaches the other end, B starts and swims towards C. C begins when B reaches her/him.

Continue in this manner whereby each swimmer gets a double rest period for each length swum, for 20 to 30 minutes.

Deep Water Exercises

PUSH-UPS

Facing the wall with legs hanging vertically and both hands on the deck, raise the body out of the water until arms are straight. Return to start keeping chin out of water.

Variations:

a) Place both hands on the deck, one on top of the other, directly in front of your face and push-up.

b) Spread arms as far as possible and push-up.

c) Turn sideways to wall, place one hand on the deck and do a one-arm push-up

d) Start as in normal push-ups and combine the Hip Raiser (below) with the regular push-ups.

DIPS

Sit on deck with legs over side of pool. Place hands so that the fingers are over the edge and the heel of the hand rests on the deck. Take all the body weight on the arms, lower your body down until your chin touches the water or you have descended as far as possible. Return to start.

LEG CIRCLES

With the body in the water, place one arm on the deck or in the gutter so that your body is vertical and at right angles to the wall. Rotate the outer leg in as large a circle as possible. Reverse the direction. Repeat on opposite side.

LEG RAISES

Spread arms full width in gutter, legs vertical. Keeping the small of your back against the wall as long as possible, raise both legs (knee straight) until the toes break the surface. At this point, pull the knees into the chest and drop the legs to the start position.

KNEE TUCK

Spread arms full width in the gutter, legs vertical. Roll both knees up until they are tucked under chin and break water's surface. Return to start.

THE CHAIR

Arms spread full width in gutter, assume a sitting position (as in a chair). Keep both knees together and rotate left and right until the knees touch the wall on either side.

STRADDLES

Arms spread full width in gutter, legs vertical. Spread legs as far as possible and return to start. Variation: arms as above, legs at right angles to upper body, spread and return.

ACHILLES STRETCH

Face wall hanging on to gutter. Place both feet flat on the wall, knees between the arms. Press slowly back until legs are straight. Return to start.

HIP RAISER

Place both hands on the deck, elbows straight and legs hanging vertically into pool (as in the top position of a push-up). Keep elbows and legs straight and raise hips as high as possible. Return to start.

DEEP BOBBING

Descend to bottom of pool (as in feet-first surface dive) exhaling continuously while submerged. On contact with the bottom, push off vigorously, return to surface, breathe and repeat.

THE BICYCLE

Face the wall and hang on to either the gutter or deck. Hold the body at arm's length from the wall, legs vertical,and pedal vigorously. Keep the feet flat for maximum resistance.

THE PENDULUM

Arms spread full width in the gutter, legs vertical. Keeping the legs together and the heels against the wall, swing the legs left and right, bringing them as close to the surface as possible on both sides.

HEEL LIFT

Facing the wall with arms spread full width in the gutter, pull the heels up rapidly, keeping the body, from chest to knees, against the wall.

Additional References:

Conrad, C. Carson, Physical Conditioning Through Water Exercises (Washington, D.C.: President's Council of Physical Fitness and Sports).

Deck Exercises

INS and OUTS

The students stand at pool side, dive across the pool and pull themselves out on the deck on the other side of the pool in one continuous motion. If the deck is not too wide, have them touch the wall and return to the start.

VERTICAL INS and OUTS

The students stand at pool side, jump in feet first and descend to bottom of pool. On contact with bottom, they push off and return to surface, pulling themselves up on the deck in one continuous motion. These exercises are done as fast as possible.

A note of caution: If you are teaching a large group, put your best divers in the shallower water (no one in less than four feet of water). If your group is large, space them out as much as possible and always remind them to watch that no one is under them before they dive. If your group is too large for the regular INS and OUTS, bring them closer together and use the VERTICAL option.

SWIM VARIATIONS

Variations are infinite, bound only by your imagination. Listed below are a few variations to get you started.

1. One length sprints, any style -- walk back.
2. Dive and swim across pool, get out, dive and swim back.
3. Swim one length (75% effort), walk back, do five push-ups on the deck.
4. Swim one length (75% effort), walk back, assume wall sit position and hold for 30 seconds.
5. Others include: bent knee sit-ups, burpees, chest raise, etc.

Aerobic Swimming

SWIMMING EXERCISE PROGRAM

Source: The New Aerobics by Kenneth Cooper, M.D.

Overhand Crawl

Week	Distance (yards)	Time (mins)	Freq/week	Aerobic Points/week
1	100	2:30	5	6
2	150	3:00	5	7½
3	200	4:00	5	7½
4	250	5:00	5	10
5	250	5:30	5	10
6	300	6:00	5	12½
7	300	6:00	5	12½
8	400	8:30	5	17½
9	400	8:30	5	17½
10	400	8:00	2	19
	and			
	500	10:30	3	
11	400	8:00	2	22
	and			
	600	12:30	3	
12	500	10:30	3	24
	and			
	700	14:30	2	
13	600	12:30	3	25
	and			
	800	16:30	2	
14	600	12:30	2	29½
	and			
	800	16:00	3	
15	700	13:00	5	30
16	1000	19:30	4	34

Annotated Bibliography

1. EXERCISE DIAGRAMS

The Diagram Group. The Complete Encyclopedia of Exercises. New York: Paddington Press Ltd., 1979.

Lists hundreds of calisthenic diagrams. A good source when you need some fresh ideas for specific exercises. Of interest will be the sections on T'ai Chi, exercise for sport, and doubles routines.

Harper, P. R. Mobility Exercises. London: British Amateur Athletic Board, 1979.

Contains many photographic plates of flexibility exercises related to track and field. Near the end, many of the illustrations deteriorate into stick-man figures.

2. WEIGHT TRAINING AND CIRCUIT TRAINING

Howell, M. L., and W. R. Morford. Fitness Training Methods. Ottawa: C.A.H.P.E.R., 1966.

Still one of the best books on strength training and the use of conventional equipment. All exercises are photographed and keyed to anatomical charts. Pages could be cut out and posted directly to bulletin board charts. There is an excellent section on fixed circuits and the MacDonald Abdominal Exercise Program.

3. THEORY AND PRACTICAL

Katch, F. I., and W. D. McArdle. Nutrition, Weight Control, and Exercise. Boston: Houghton Mifflin Co., 1977.

One of the newer texts which combines nutrition theory with practical aerobics, circuits, and specificity strength training. Excellent diagrams are included which can be easily transferred to over-head transparencies for health education classes.

Myers, C. R., L. A. Golding, and W. E. Sinning. The Y's Way to Physical Fitness. Emmaus, Penn.: Rodale Press, 1973.

Over 50 physical educators were invited to meet and contribute key sections to this unique manual. Numerous photographic plates and many lesson plan ideas for adults and youth.

Carre, F. Alex, Charles B. Corbin, and Ruth Lindsey. Fitness for Life: Physical Education Concepts. Agincourt, Ont.: Gage, 1980.

Another text that one should have for quick reference. Each section (strength, endurance, etc.) is a blend of theory, lesson plans, photo-charts, and graded activities. And best of all -- the book is written for youngsters, not adults.

4. MANITOBA DEPARTMENT OF EDUCATION BOOKLETS

Ogston, J., et al. "Daily Physical Education and Physical Fitness Programs." Winnipeg: Curriculum Services, Department of Education, 1979.

Time-tabling and space allocation; teacher roles; exercise do's and don't's; fitness to music; music; casino; task circuits; in-class activities; competitive and non-competitive tabloids.

Brown, E., and A. Ducharme. "Elementary Fitness Concepts and Activities". Winnipeg: Curriculum Services, Department of Education, 1976.

Cardiovascular activities and games, flexibility activities, and explanation of muscular endurance calisthenics (not illustrated).

Johnson, F. W., and P. McCarthy. Fitness as Simple as ABC. Winnipeg: Curriculum Services, Department of Education, 1978.

A resource book outlining five stages required for improving personal physical fitness. Many of the plates are designed specifically for use with over-head projection.